



U.S. NAVY

Naval Air Station, Oceana

Remedial Alternatives for
SWMUs 2B, 2C, & 2E

Restoration Advisory Board
February 2001



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Naval Air Station, Oceana



Three SWMU 2B Alternatives

- SWMU 2B MCL Exceedances: total and dissolved arsenic & antimony, bis(2-ethylhexyl)phthalate, cis-1,2-dichloroethene, trichloroethene, vinyl chloride
- No Action
- IC, LTM (likely the preferred alternative)

Three SWMU 2C Alternatives

- SWMU 2C MCL Exceedances:
trichlorethene, cis-1,2-DCE, vinyl
chloride, and benzene
- No Action
- MNA and IC

Three SWMU 2E Alternatives

- SWMU 2E MCL Exceedances: total and
dissolved arsenic, benzene, bis(2-
ethylhexylphthalate), and vinyl chloride
- No Action
- IC, LTM, (likely the preferred
alternative)
 - IC implementing restrictions on excavation
and groundwater extraction

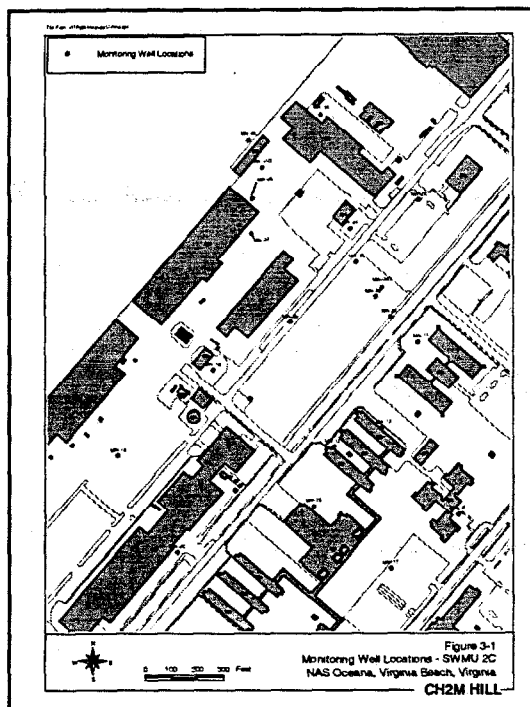
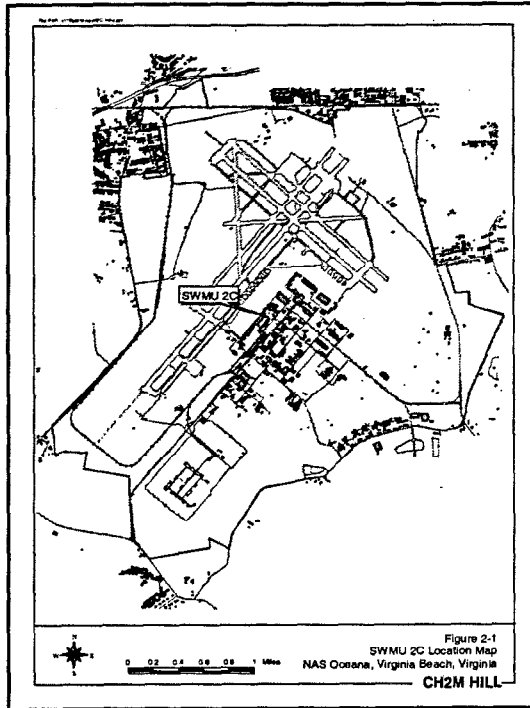


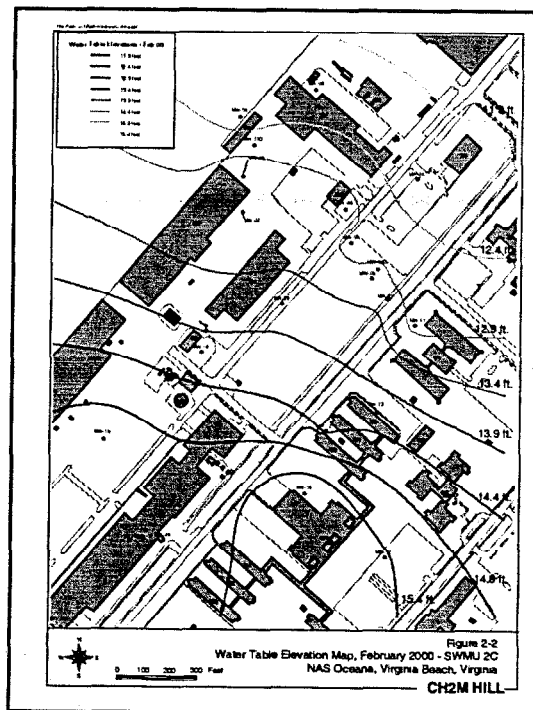
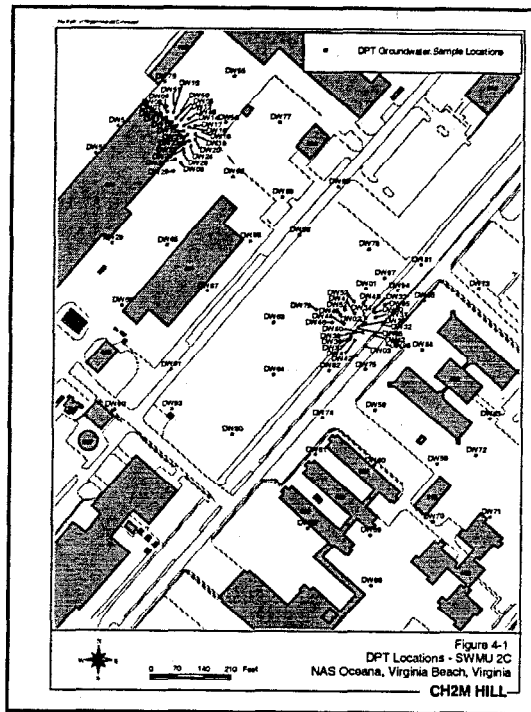
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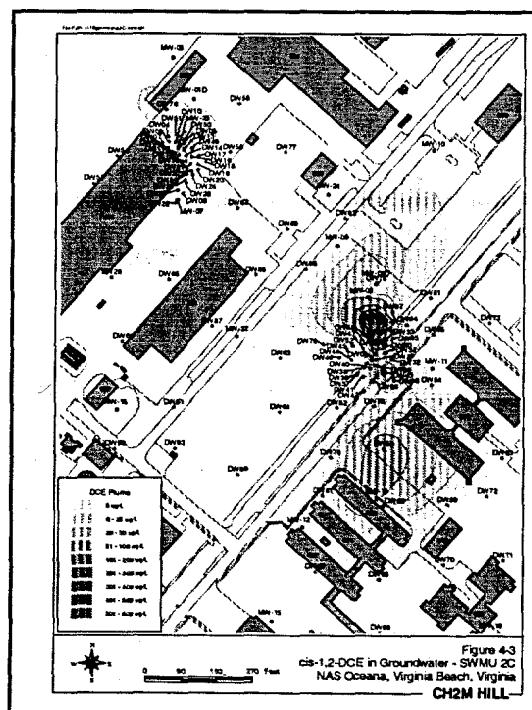
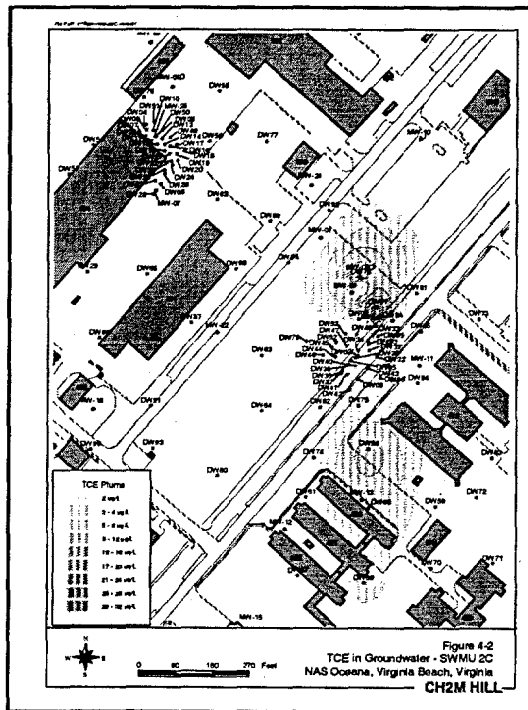


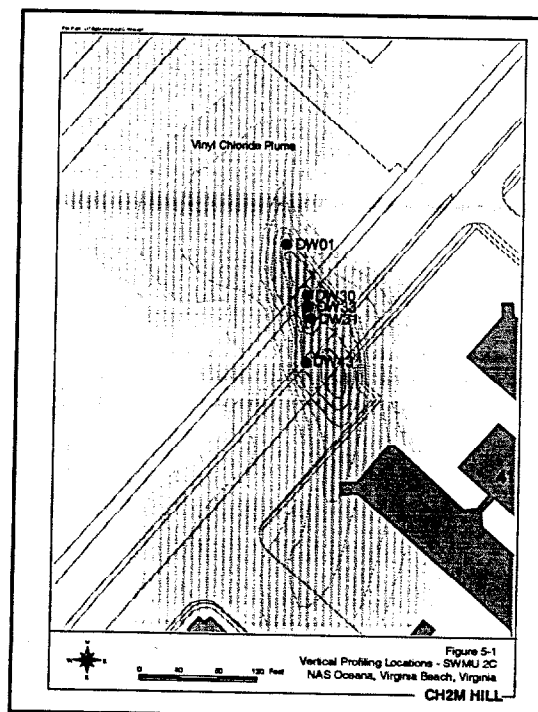
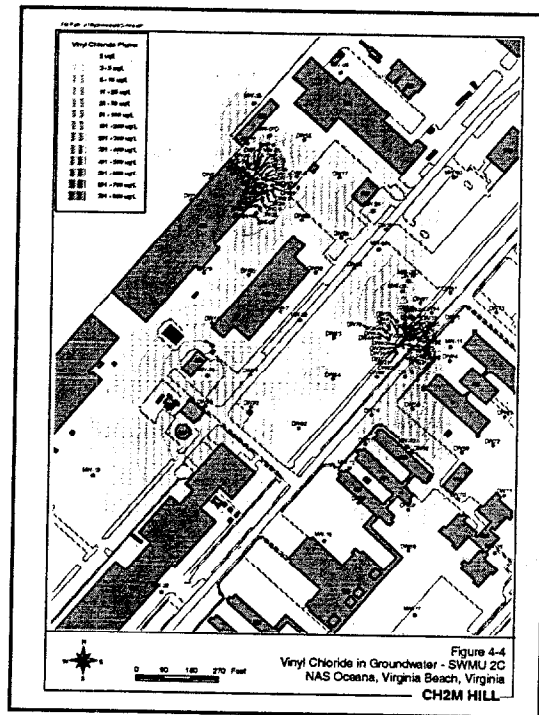
Investigation Objectives

- Sample Groundwater from the SWMU Monitoring Wells
- Sample Groundwater from the Water Table Aquifer using Direct Push Technology (DPT)
- Analyze the Groundwater Samples in a Close Support Laboratory (CSL) for Chlorinated VOCs
- Prepare a Technical Memorandum with Recommendations for Innovative Remediation
- Present Results to the Partnering Team











Conclusions

- Groundwater at SWMU 2C contains concentrations of TCE, *cis*-1,2-DCE, and vinyl chloride at concentrations that exceed MCLs
- Benzene is also detected at levels that exceed MCLs
- The greatest response to the ECD was at a depth interval of 21 to 24 feet bgs, in the upper strata of the lower confining unit



Conclusions

- TCE is being reduced to *cis*-1,2-DCE, which is being further reduced to vinyl chloride, which is being further reduced to ethene
- Vinyl chloride appears to be accumulating
- In addition, depleted oxygen and ethene and chloride production support the interpretation that anaerobic degradation of chlorinated hydrocarbons is occurring



Recommendations

- Active groundwater remediation in combination with attenuation enhancement is recommended to augment the natural biodegradation process:
 - NoVOCs® or similar Technologies which Strip, Aerate, and/or Augment
 - Addition of Hydrogen for TCE & *cis*-1,2-DCE
 - Addition of Oxygen for Vinyl Chloride Reduction
 - Addition of a Carbon Source for Vinyl Chloride Reduction
- FS will Document Alternatives for Evaluation by the Team